

CLAIMS

1. An apparatus for multi-cast transmissions that minimize channel
2 resources, comprising:
a memory element; and
4 a processing element for executing a set of instructions stored in
the memory element, the set of instructions for:
6 generating an identifier for a group of subscribers, wherein the
identifier is for accessing a multi-cast service;
8 using channel quality information for at least one subscriber to
determine the timing of the multi-cast service to the group of subscribers;
10 and
transmitting the identifier and the multi-cast service on at least one
12 channel, wherein the multi-cast service is transmitted in accordance with
the timing determined by the channel quality information.
2. The apparatus of Claim 1, wherein transmitting the identifier and
2 the multi-cast service on at least one channel comprises:
transmitting the identifier on a first channel; and
4 transmitting the multi-cast on a second channel.
3. The apparatus of Claim 2, wherein the processing element is
2 further for executing instructions for:
scrambling the multi-cast service before transmitting the multi-cast
4 service on the second channel, wherein the scrambling is performed by
using a code known only to the group of subscribers.
4. The apparatus of Claim 1, wherein using channel quality
2 information for at least one subscriber to determine the timing of the multi-cast
service comprises:

4 choosing channel quality information by selecting the channel
quality information associated with the subscribers with the worst channel
6 conditions; and

determining the timing of the multi-cast service in accordance with
8 the subscribers with the worst channel conditions.

5. The apparatus of Claim 4, wherein the channel quality information
2 is a measurement of the channel interference of the forward link common pilot
signal.

6. The apparatus of Claim 4, wherein the channel quality information
2 is derived from the transmission power levels of a base station.

7. The apparatus of Claim 4, wherein the channel quality information
2 is a plurality of acknowledgment signals.

8. The apparatus of Claim 7, wherein choosing the channel quality
2 information of the subscribers with the worst channel conditions comprises:

transmitting a plurality of test data packets to the group of
4 subscribers;

waiting for a plurality of acknowledgment signals from the group of
6 subscribers in response to the plurality of test data packets; and

transmitting the multi-cast service if the plurality of
8 acknowledgment signals indicates a response from a predetermined percentage
of the group of subscribers.

9. The apparatus of Claim 1, wherein using channel quality
2 information for at least one subscriber to determine the timing of the multi-cast
service comprises:

4 choosing the channel quality information of the subscriber with the worst
channel conditions;

6 determining the timing of the multi-cast service in accordance with the
subscriber with the worst channel condition.

10. The apparatus of Claim 9, wherein the channel quality information
2 is an acknowledgment signal from the subscriber with the worst channel
condition.

11. An apparatus for multi-cast transmissions that minimize channel
2 resources, comprising:
a memory element; and
4 a processing element for executing a set of instructions stored in
the memory element, the set of instructions for:
6 generating an identifier for a group of subscribers, wherein the
identifier is for accessing a multi-cast service;
8 using channel quality information for at least one subscriber to
determine the transmission format of the multi-cast service to the group
10 of subscribers; and
transmitting the identifier and the multi-cast service on at least one
12 channel, wherein the multi-cast service is transmitted in accordance with
the transmission format determined by the channel quality information.

12. The apparatus of Claim 11, wherein transmitting the identifier and
2 the multi-cast service on at least one channel comprises:
transmitting the identifier on a first channel; and
4 transmitting the multi-cast on a second channel.

13. The apparatus of Claim 12, wherein the processing element is
2 further for executing instructions for:
scrambling the multi-cast service before transmitting the multi-cast
4 service on the second channel, wherein the scrambling is performed by
using a code known only to the group of subscribers.

14. The apparatus of Claim 11, wherein using channel quality
2 information for at least one subscriber to determine the transmission format of
the multi-cast service comprises:

- 4 choosing channel quality information by selecting the channel
quality information associated with the subscribers with the worst channel
6 conditions; and
determining the transmission format of the multi-cast service in
8 accordance with the subscribers with the worst channel conditions.

15. The apparatus of Claim 14, wherein the channel quality
2 information is a measurement of the channel interference of the forward link
common pilot signal.

16. The apparatus of Claim 14, wherein the channel quality
2 information is derived from the transmission power levels of a base station.

17. The apparatus of Claim 14, wherein the channel quality
2 information is a plurality of acknowledgment signals.

18. The apparatus of Claim 17, wherein choosing the channel quality
2 information of the subscribers with the worst channel conditions comprises:
transmitting a plurality of test data packets to the group of
4 subscribers;
waiting for a plurality of acknowledgment signals from the group of
6 subscribers in response to the plurality of test data packets; and
transmitting the multi-cast service if the plurality of
8 acknowledgment signals indicates a response from a predetermined percentage
of the group of subscribers.

19. The apparatus of Claim 11, wherein using channel quality
2 information for at least one subscriber to determine the transmission format of
the multi-cast service comprises:
4 choosing the channel quality information of the subscriber with the worst
channel conditions;
6 determining the transmission format of the multi-cast service in
accordance with the subscriber with the worst channel condition.

20. The apparatus of Claim 19, wherein the channel quality
2 information is an acknowledgment signal from the subscriber with the worst
channel condition.

21. An apparatus for multi-cast transmissions that minimize channel
2 resources, comprising:
a memory element; and
4 a processing element for executing a set of instructions stored in
the memory element, the set of instructions for:
6 determining the channel quality information for a plurality of
subscribers;
8 identifying the subscriber with the worst channel conditions;
scrambling a multi-cast service using a scrambling code known to
10 the plurality of subscribers; and
transmitting the scrambled multi-cast service to the plurality of
12 subscribers, wherein the scrambled multi-cast service is transmitted in
accordance with a transmission format that is optimal for the subscriber
14 with the worst channel conditions.

22. A method for broadcasting to a group of subscribers in a cellular
2 communication network, comprising:
determining the channel quality information for a plurality of subscribers;
4 identifying the subscriber with the worst channel conditions;
scrambling a multi-cast service using a scrambling code known to the
6 plurality of subscribers; and
transmitting the scrambled multi-cast service to the plurality of
8 subscribers, wherein the scrambled multi-cast service is transmitted in
accordance with a transmission format that is optimal for the subscriber with the
10 worst channel conditions.

23. A method for broadcasting to a group of subscribers in a cellular
2 communication network, comprising:
generating an identifier for a group of subscribers, wherein the identifier
4 is for accessing a multi-cast service;

using channel quality information for at least one subscriber to determine
6 the timing of the multi-cast service to the group of subscribers; and
transmitting the identifier and the multi-cast service on at least one
8 channel, wherein the multi-cast service is transmitted in accordance with the
timing determined by the channel quality information.

24. A method for broadcasting to a group of subscribers in a cellular
2 communication network, comprising:
generating an identifier for a group of subscribers, wherein the identifier
4 is for accessing a multi-cast service;
using channel quality information for at least one subscriber to determine
6 the transmission format of the multi-cast service to the group of subscribers;
and
8 transmitting the identifier and the multi-cast service on at least one
channel, wherein the multi-cast service is transmitted in accordance with the
10 transmission format determined by the channel quality information.

25. A method for efficient multi-cast broadcasting, comprising:
2 generating an identifier for a group of subscribers, wherein the identifier
is for accessing a multi-cast service;
4 identifying the subscriber with the worst channel quality by analyzing a
plurality of channel quality feedback indicators from a group of subscribers;
6 selecting a timing and a transmission format of the multi-cast service so
that the multi-cast service will be received by the subscriber with the worst
8 channel conditions; and
transmitting the identifier on a first channel and the multi-cast service on
10 a second channel in accordance with the timing and the transmission format as
determined by the subscriber with the worst channel quality.

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